BOOK REVIEW

The Gunong Benom Expedition, 1967: Parts 11–13. R. Traub. *Bulletin of the British Museum (Natural History) Zoology*, Vol. 23, No. 9–11. London, 1972. Notes on zoogeography, convergent evolution and taxonomy of fleas (Siphonaptera), based on collections from Gunong Benom and elsewhere in Southeast Asia. I. New taxa (Pygiopsyllidae, Pygiopsyllinae), pp. 201–305, 58 plates. II. Convergent evolution, pp. 307–387, 20 plates. III. Zoogeography, pp. 389–450.

In the first paper of this series a new genus for the *S. robinsoni* group is erected, the hosts and distribution of the Malayan peninsular species of the group are discussed, a new genus for the *S. ferinus* group is described, and keys to the new and old forms are provided. Heretofore unknown males and females of various species are described for the first time. The molding influence of the environment on these fleas and the principles involved in their evolution and adaptation are described in the second article. In the third paper the author presents evidence that fleas in the family Pygiopsyllidae originated in the Australian region and moved to the mainland of Asia. He gives convincing data concerning the Australian roots of the genus *Medwayella*, which probably originated in Borneo, thereafter moving to the Asian mainland and Indochina, as well as to the Philippines. The speculation and discussion concerning the transport by rats of Palearctic fleas from the west and northwest, with at least one species, *Sigmacteus*, reaching New Guinea, are most interesting. Malaya, Sumatra, Java, and Borneo share many faunal features, but there are significant differences between the mammals and fleas of Sarawak and those of Sabah, with those of the former resembling Malaya more than the latter.

The descriptions of methods of collecting fleas in the tropics will be of special interest to field workers. The major collecting areas were in forests, at elevations between 800 and 2000 feet, usually in primary jungle but also in secondary forests and bamboo areas. Rats, tree shrews, and tree and ground squirrels were trapped and examined by the author while he served as Commanding Officer of the U.S. Army Medical Research Unit in Malaya from 1948 to 1959. In addition, collections were made by others throughout the Southeast Asian region. There were inherent disadvantages so far as collecting fleas on trapped animals was concerned. Fleas tend to leave their hosts soon after feeding, or leave the animals when the animals become excited and agitated. Heavy rain, a daily occurrence in the tropical rain forest, also depletes the flea population on trapped animals. Even more disastrous is the situation when killed animals are examined, because, within minutes, dead rats or squirrels invariably attract swarms of ants, rarely leaving fleas on the carcasses. Therefore, trapping was supplemented by shooting, usually at night, when the eyes of mammals would glow in the light from powerful flashlights.

Entomologists will find the descriptions of the new taxa, the discussion of the convergent evolution, and the zoogeography of fleas a useful guide and reference source for every aspect of flea research.

The definitive descriptions of fleas of Southeast Asia and the Indo-Australian Archipelago contained in these three superbly illustrated issues of the *Bulletin of the British Museum* will be of interest not only to taxonomists but also to medical officers and students of evolution. Altogether this monumental work, containing 244 pages and 78 plates, is truly outstanding. It constitutes exciting reading for everyone interested in the intriguing aspects of collecting and handling fleas and the formidable difficulties that may be encountered. Throughout the vast area of collection, *Stivalius sensu lat.* is a potential vector of plague, and, in fact, it has been found infected with plague in India and Java.

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